What is claimed is:

1. A species transfer device designed for communication with a first and second stream of a fuel cell, the device comprising:

(a) a housing assembly having a first stream inlet and outlet, and a second stream inlet and outlet; and

(b) an exchange matrix housed within said housing assembly;

said housing assembly providing a path for said first stream of a fuel cell entering the first stream inlet, traveling through said exchange matrix, and exiting the first stream outlet, and providing a path for said second stream of a fuel cell entering the second stream inlet, traveling through said exchange matrix, and exiting the second stream outlet;

said species transfer device capable of transferring a portion of a species from one of said first stream and said second stream to the other of said first stream and second stream, thereby conditioning said fuel cell streams.

2. The species transfer device of Claim 1, further comprising a sealing system.

3. The species transfer device of Claim 1, wherein the exchange matrix has an average linear coefficient of thermal expansion at 25 to 800° C of less than about 20 x 10^{-7}/°C

4. The species transfer device of Claim 3, said exchange matrix being capable of rotation within said housing enclosure.

5. The species transfer device of Claim 4, said exchange matrix being a cylinder of a porous material, said exchange matrix having a first and second end and a central core therethrough.

6. The species transfer device of Claim 4, said exchange matrix divided into fully segmented sections.

7. The species transfer device of Claim 4, said housing assembly further comprising a driving device capable of providing rotation to said exchange matrix.

8. The species transfer device of Claim 1, said exchange medium having sorbent characteristics.

9. The species transfer device of Claim 1, said exchange medium in combination with a sorbent.

10. The species transfer device of Claim 1, said exchange medium is a magnesium aluminum silicate.

11. The species transfer device of Claim 9, said magnesium aluminum silicate is cordierite.

12. The species transfer device of Claim 1, said exchange medium is at least 50% cordierite.

13. The species transfer device of Claim 3, media element being a unitary cylinder of exchange media.

14. The species transfer device of Claim 1, the enhancement technique being electrohydrodynamic enhancement.

15. The species transfer device of Claim 1, the enhancement technique being fluidic oscillation.

16. The species transfer device of Claim 5, the enhancement technique being media shuffling.

17. The species transfer device of Claim 1, the device being a single-pass device.

18. The species transfer device of Claim 1, the device being a double-pass device.

19. The species transfer device of Claim 5, further comprising a pressure equalizing system to reduce the pressure differences between active sections of the media, wherein active sections of the wheel are those sections of the media in flow communication with a stream.

20. The species transfer device of Claim 1, the media element and sealing system being a unitary element being easily disposable.

21. The species transfer device of Claim 1, the first stream having a first potential of a first species and a second potential of a second species, the second stream having a lower potential of the first species than the first stream and a higher potential of the second species than the first stream, the species transfer device capable of transferring a portion of the first species from the first stream to the second stream and a portion of the second species from the second stream to the first stream.

22. The species transfer device of Claim 1, said housing enclosure having a third stream inlet and outlet, said housing enclosure capable of providing a path for a third stream entering the third stream inlet, traveling through said exchange matrix, and exiting the third stream outlet;

said species transfer device capable of transferring a portion of a species from the first stream and the second stream to the third stream.

23. The species transfer device of Claim 1, the sealing system comprising a labyrinth seal optionally used in conjunction with a sealing fluid injected into leak paths in the media.

24. The species transfer device of Claim 2, the sealing system comprising a mattress assembly on either end of the media element, the mattress assembly providing a sealing relationship between the ends of the media element and end caps frictionally engaging the inside of the housing enclosure.

25. A species transfer device designed for communication with a first and second stream of a fuel cell, the device comprising:

(a) a housing enclosure having a first stream inlet and outlet, and a second stream inlet and outlet, and further having an inner surface;

(b) an exchange matrix element, said exchange matrix having an average linear coefficient of thermal expansion at 25 to 800° C of less than about 20 x 10^{-7}/°C and being in the form of a cylinder having a first and second end, and a central core therethrough; and

said housing enclosure providing a path for said first stream of a fuel cell entering said first stream inlet, traveling through said exchange matrix, and exiting said first stream outlet, and providing a path for said second stream of a fuel cell entering the second stream inlet, traveling through said exchange matrix, and exiting the second stream outlet;

said first stream having a higher potential of a species than said second stream, said species transfer device capable of transferring a portion of the species from the first stream to said second stream.

26. The species transfer device of Claim 25, further comprising a sealing system, said sealing system discouraging interactions between the first and second streams as they flow in and out of said housing enclosure.

27. The species transfer device of Claim 25, media element being a plurality of cylindrically axial wedges insertable into a spoke carriage designed to secure such wedges.

28. The species transfer device of Claim 25, the sealing system comprising wagon wheel end caps located on either end of the media element, the end caps frictionally engaging the inside of the housing enclosure.

29. The species transfer device of Claim 26, the sealing system comprising a spring loaded device to apply the sealing force to sealing plates.

30. The species transfer device of Claim 26, the sealing system comprising a labyrinth seal optionally used in conjunction with a sealing fluid injected into leak paths in the media.

31. The species transfer device of Claim 28, said first and second end plates each incorporating at least two spokes, a center and an outer ring, each said spoke extending

radially between the center and outer ring, said first and second end plates serving to cap the ends of said exchange matrix in order to provide a seal between said exchange matrix and the inner surface of said housing enclosure;

the first stream having a lower potential of the species than the second stream, the species transfer device capable of transferring a portion of the species from the second stream to the first stream.

32. The species transfer device of Claim 31, the species being latent heat, and said compression subassembly comprising a compression spring running through said central core of said exchange matrix, the ends of said spring being attached to the centers of said first and second end plates.

33. The species transfer device of Claim 31, the species being sensible heat, and said ends of said exchange matrix being provided with radially grooves extending from said core of said exchange matrix, said spokes of said end plates capable of fitting into said radial grooves wherein the number and orientation of said radial grooves match the number and orientation of said spokes of said end plates.

34. The species transfer device of Claim 25, wherein said exchange medium is in combination with a sorbent.

35. The species transfer device of Claim 25, said exchange medium is a magnesium aluminum silicate.

36. The species transfer device of Claim 35, said magnesium aluminum silicate is cordierite.

37. The species transfer device of Claim 25, said exchange medium comprising at least 50% cordierite.

38. The species transfer device of Claim 25, further comprising an enhancement system.

39. A species transfer device designed for communication with a first and second stream of a fuel cell, the device comprising:

(a) a housing assembly having a first stream inlet and outlet, and a second stream inlet and outlet; and

(b) an exchange matrix housed within said housing assembly, said exchange matrix comprised of a magnesium aluminum silicate having an average linear coefficient of thermal expansion at 25 to 800° C of less than about 16 x 10^{-7}/°C;

said housing assembly providing a path for said first stream of a fuel cell entering said

first stream inlet, traveling through said exchange matrix, and exiting said first stream outlet, and providing a path for said second stream of a fuel cell entering said second stream inlet, traveling through said exchange matrix, and exiting said second stream outlet;

said species transfer device capable of transferring a portion of a species from one of the first stream and the second stream to the other of the first stream and second stream.

40. A fuel cell stream conditioning system comprising:

(a) a species transfer device, wherein the species transfer device contains an exchange medium, wherein the exchange medium is a ceramic medium having an average linear coefficient of thermal expansion at 25 to 800° C of less than about 20 x 10^{-7}/°C;

(b) a first stream of a fuel cell directed through the species transfer device; and

(c) a second stream of a fuel cell directed through the species transfer device;

said species transfer device transferring a portion of a species from one of said first stream and said second stream of a fuel cell to the other of said first stream and second stream of a fuel cell.